The project has three major components:

1. **Outline connections**
   - **Sustainability**
   - **Crop**
   - **Wild pollinators, and wild bees in particular, are key to maintaining biodiversity as their pollination support reproduction of many wild plants and**
   - **Plants.**

   In this section please summarize how the project supports UBC’s sustainability goals, your department’s sustainability goals and operational contribution to entomological purpose.

   - **Project Title:** Investigating Native Pollinators at UBC Botanical Garden
   - **Project Main Purpose:**
     - The purpose is twofold:
     1. To explore and identify the diversity of pollinators bees found at UBC Botanical Garden with a particular focus on bees.
     2. To research what habitats or plants support or impact native bee pollinators.

   **Project Background/Context:**
   - Protecting pollinator species is becoming an increased concern worldwide. The UBC Botanical Garden is interested to know what type of native bees are present within the Garden. Beaty Biodiversity Museum houses the Spencer Entomological Collection containing many pollinator species collected at UBC Botanical Garden. However, many of the collected species have not been organized. If we are able to sort and identify the bee species present within the Entomological collection that were collected from the Garden, we can use that information to investigate the diversity of species present and the preferred ecological conditions for the native bees. If we begin to understand the diversity of bees present and habitats they prefer, we will be better able to better protect existing habitat and create policy to promote the development of new habitat.

   **Contribution to Sustainability at UBC:**
   - In this section please summarize how the project supports UBC’s sustainability goals, your department’s sustainability goals and operational plans.
   - Wild pollinators, and wild bees in particular, are key to maintaining biodiversity as their pollination serve supports reproduction of many wild plants and crop plants. While honey bees have received significant attention, we know less about the natural history of native bees. This project will support sustainability goals around biodiversity, teaching, learning and research specific to operations and infrastructure. Through UBC Botanical Garden’s connections to community partners, this project will also support and connect with citizen science happening in the City of Vancouver.

   **Outline of Project Details:**
   - The project has three major components:
     1. **An inventory and survey of the bee species present in the Spencer Entomological Collection.** The student will draw on support from the Beaty Biodiversity Museum for aid in organizing and identification. **Deliverables:** The student is not required to do a taxonomical identification however they should have the ability to identify distinct bee species collected from UBC Botanical Garden.
     2. **Bee inventory at the UBC Botanical Garden:** **Deliverables:** The student is expected to develop a methodology for creating a bee inventory at UBC Botanical Gardens that can then be used to inform an ongoing, volunteer-based bee monitoring program once the project is complete. Methods of collecting native bees and IDing them in the Garden will be explored. Techniques include simple pan traps along with a transact monitoring program. The specimen information will be provided to the Botanical Garden as well as deposited into the Spencer Entomological Museum. The methodology used in this component of the project will inform volunteer training materials.
     3. **A final digital output:** An excel list of pollinator species, and an audio or visual component to include on the Biodiversity Web Platform. Brainstorming for this component will begin at the kickoff meeting.

   To ensure input from Botanical Gardens and Spencer Entomological Collection, we will schedule four key meetings throughout the fall and winter terms. An initial kickoff, two check-ins and a close-out meeting in the spring. These meetings will provide an opportunity for the client to express feedback, for students to ask for clarification and outline progress to date. Specific meeting dates will be determined at the initial
kickoff and more may be scheduled through email or phone as the term continues and as the student/client see fit.

**Deliverables:**
This section pertains to what is expected at project completion. All SEEDS Projects require an executive summary, a report, and a presentation.

**Required:**
- Critical Milestones (please click on link for more information)
- Executive Summary (2 page max.)
- Report
- Presentation at closeout meeting and participation and/or contribution to Biodiversity Showcase
- Digital Output: Map, infographic, animation, etc.

**Optional:**
- Other (e.g. prototypes, a demonstration, conceptual designs, full build, video, application, installation, etc.)
  Please specify other deliverables
- Training materials for the Botanical Gardens to continue the study with volunteers and/or other students.

**Anticipated Outcomes:**
The anticipated outcome of this project is an increased understanding of the native bee populations on campus through their identification and observation of ecological characteristics at UBC Botanical Garden. The methodology of this research will be used to develop research and training materials for volunteers to continue the study. Finally, a digital component will be created to be featured on the Biodiversity Online Resource to communicate the project to the wider campus community.

**Anticipated Initiation and Completion Date:**
Please indicate the optimal timeline you would like this student research project conducted and any key milestone deliverables.
- September-Spring 2017
- Phase 1: Pollinator Identification at Spencer Entomological Collection
- Phase 2: Literature Review + Methodology Development
- Phase 3: Monitoring of Bee Populations at the Botanical Gardens
- Phase 4: Production of Outputs

**Special considerations:**
Please list any special factors that the student(s) will need to take into account (equipment, location, constraints, existing material, etc.).

- The student will have to be available during the summer months as this is when pollinators are most active.

**Potential information sources:**
Spencer Entomological Collection, other sources will be shared with the student or students.

**Please specify any documents, literature or other sources that you think can be used to inform the students work:**

**Desired Student Qualifications:**
Please describe experience, background and skillset qualifications that students will need to have in order to successfully complete the project.
This section will be used to match suitable students with your project.

- The desired student will have a background (coursework or volunteer experience) in Entomology and data collection methods. The desired student will have interest in adapting their methodology for the development of training materials to continue data collection with “citizen scientist” volunteers at the UBC Botanical Garden.
**PART 2: PROJECT TEAM**

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<th><strong>Primary Staff Client:</strong></th>
<th>UBC Botanical Garden</th>
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<th><strong>Secondary Staff Client:</strong></th>
<th>Department of Zoology</th>
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<tr>
<th><strong>Faculty:</strong></th>
<th>Faculty of Land and Food Systems</th>
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<th><strong>Student(s):</strong></th>
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<th><strong>SEEDS Program Representative:</strong></th>
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<th><strong>Other:</strong></th>
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**PART 3: ANTICIPATED OPERATIONAL STAFF, FACULTY AND STUDENT RESPONSIBILITIES**
Staff Client(s):
- Review project proposal.
- Attend initial project team “kick-off” meeting or workshop to review project proposal collaboratively, discuss expectations, identify resources, and to set agreed-upon project milestones.
- Commit to ongoing communication engagement with the project member or team. This is typically through meetings, email communication or in-class workshops.
- Review and provide comment on any submitted progress reports and draft report.
- Attend final project report presentation.
- Complete the end of term SEEDS Project Evaluation Surveys.
- Inform SEEDS Sustainability Program Representative if any work content is sensitive and/or confidential in nature, and what measures they would like to implement to manage this content.
- If you are contacted by the media or initiate contact with the media please inform them that you are not speaking on behalf of the SEEDS Sustainability Program. If you expect that your project will receive media coverage please inform SEEDS Sustainability Program Representative.

Faculty:
- Explain how student will be graded for the project and how the project mark fits into the course mark.
- Support student throughout project with expertise and advice as needed.
- Ensure students understand their reports will be published and made available to the public.
- Ensure students understand that they can opt out of having reports published by submitting a written request to the SEEDS Program or contacting SEEDS.opt.outs@ubc.ca.
- Attend student presentation of project.
- Complete the end of term SEEDS Project Evaluation Surveys.
- If you are contacted by the media or initiate contact with the media please inform them that you are not speaking on behalf of the SEEDS Sustainability Program. If you expect that your project will receive media coverage please inform SEEDS Sustainability Program Representative.

Student:
- Meet project deliverables.
- Propose and commit to ongoing communication engagement schedule with your staff clients and other project team members. This is typically through meetings, email communication or in-class workshops and serves as an opportunity to discuss project progress and receive guidance. Attend final meeting with staff and present final research deliverables including your recommendations for implementation and future research.
- Using the SEEDS Cover Page template, electronically submit the project report including an executive summary, to UBC SEEDS Sustainability Program within two weeks of project completion. SEEDS Sustainability Program staff will distribute the published report to all project team staff clients.
- Ensure there is no personal information (student ID, e-mail addresses, phone numbers, etc.) in the body of the final project report.
- Student reports will be published and made available to the public. Students will receive an email with a link to their report and opt-out information. If you do not want your report to be published through public channels, please inform the SEEDS Program in writing, or contact SEEDS.opt.outs@ubc.ca.
- Complete the end of term SEEDS Project Evaluation Surveys.
- If you are contacted by the media or initiate contact with the media please inform them that you are not speaking on behalf of the SEEDS Sustainability Program. If you expect that your project will receive media coverage please inform SEEDS Sustainability Program Representative.
- Have you considered taking and submitting photos of your SEEDS project?
   You can submit up to eight (8) high-resolution photos with your final project report. The SEEDS Sustainability Program may use your photo for promotional purposes such as online (website), through social media (Facebook, Twitter, Instagram), or in print publications.
Photo credit will be given to the photographer in all instances so please tell us who took the photo. You will also need to have photo consent forms signed by anyone who you photographed and submitted with the photograph.

Some tips to taking a good photo with your phone:
- Focus on capturing emotion and action
- Take the photo with your phone positioned horizontally
- Follow the rule of thirds (check out Wikipedia for a definition)
- If you are taking pictures with people, expressions should be confident, honest, open, socialable, and bold (looking directly at the camera), where appropriate